

CLMPTO

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CLAIMS 1 – 29 (CANCELLED)

Claim 30 (New): A peripheral device comprising:

means for printing a paper sheet;

means for cutting the paper sheet; and

means for receiving instructions,

wherein the means for printing comprises a first print head, supplied by an ink cartridge to print text or drawings on the sheet of paper by ink ejection as a function of the received instructions, and a second print head, supplied by an absorbent ink cartridge capable of in depth penetration into the paper sheet, to eject ink onto locations to be cut out as a function of the received instructions, and

wherein the means for cutting comprises a low power laser emitting a laser beam with a wavelength absorbed by locations marked with the absorbent ink as a function of the received instructions, a power of the laser being sufficient to cut the paper sheet at the inked locations and/or for partial ablation of the paper.

Claim 31 (New): A device according to claim 30, wherein the absorbent ink comprises mineral or organic pigments and a solvent.

Claim 32 (New): A device according to claim 30, wherein the absorbent ink is configured such that locations inked with the absorbent ink absorb at least 50% of the laser beam at its operating wavelength.

Claim 33 (New): A device according to claim 30, wherein the absorbent ink is configured such that locations inked with the absorbent ink absorb 80% or more of the laser beam at its operating wavelength.

Claim 34 (New): A device according to claim 32, wherein the absorbent ink maintains its good absorption properties at the laser wavelength up to a temperature equal to at least 200°C and preferably up to 250°C.

Claim 35 (New): A device according to claim 30, wherein the absorbent ink comprises a constituent that produces exothermal combustion when it reaches a critical temperature, the critical temperature being between 150°C and 400°C.

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Claim 36 (New): A device according to claim 30, wherein the absorbent ink is colorless in a visible range.

Claim 37 (New): A device according to claim 30, wherein the absorbent ink is white in a visible range.

Claim 38 (New): A device according to claim 30, wherein the second print head ejects ink to print patterns in a form of lines, dashes, or dots not more than 500 μm wide.

Claim 39 (New): A device according to claim 30, wherein the second print head ejects a quantity of ink equal to between 0.5 and 5 nl per mm of cut line.

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Claim 40 (New): A device according to claim 30, wherein the laser emits a laser beam with a wavelength of between 650 and 1600 nm.

Claim 41 (New): A device according to claim 30, wherein the laser has an average light power between 0.5 and 10 watts.

Claim 42 (New): A device according to claim 41, wherein the laser has an average light power between 1 and 4 watts.

Claim 43 (New): A device according to claim 41, wherein the laser operates in a pulsed mode, and laser average power is at least 100 times lower than laser peak powers.

Claim 44 (New): A device according to claim 41, wherein the laser operates in a pulsed mode, and laser average power is at least 10 times lower than laser peak powers.

Claim 45 (New): A device according to claim 30, wherein the laser comprises one or plural semi-conducting laser diodes.

Claim 46 (New): A device according to claim 30, wherein the laser comprises a laser beam focusing device.

Claim 47 (New): A device according to claim 46, wherein the laser beam focusing device outputs a light spot with dimensions between 10 μm and 400 μm , on a field depth equal to at least 80 μm .

Claim 48 (New): A device according to claim 30, wherein the means for printing and the means for cutting are located on a same lateral displacement carriage.

Claim 49 (New): A device according to claim 30, wherein at least one face of the paper sheet close to an area illuminated by the laser is in contact with a material with a thermal diffusivity equal to at least 10 times more than a thermal diffusivity of the paper.

Claim 50 (New): A device according to claim 49, wherein the material in contact with the paper sheet close to the area illuminated by the laser is in a form of a laser cutting head that comprises:

- a contact area in contact with the sheet and having a surface of at least 0.5 cm^2 ;
- a perforated part in the contact area enabling passage of the laser beam, and with a

section equal to or greater than 1 mm² at a location at which the perforated part comes into contact with the paper; and

a pure air inlet and a combustion fumes evacuation duct.

Claim 51 (New): A procedure for aligning an ink cartridge with a laser beam of the device according to claim 30, comprising:

making a first series of parallel marks on a paper sheet using the ink cartridge of the first print head, the marks being separated by a predetermined pitch;

making a second series of parallel marks facing the first series of marks, using the ink cartridge of the second print head, an inking width of the marks in the second series being sufficient to compensate for misalignment between the absorbent ink cartridge and the laser, and being spaced by a second determined pitch different from the first pitch;

laser cutting on the series of marks inked with the absorbent ink, using the laser;

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observing the cuts and sending information to the printer or a computer controlling the printer to identify which marks printed with ink coincide with the cuts.

Claim 52 (New): A procedure for aligning an absorbent ink cartridge with the laser beam of the device according to claim 30, comprising:

making a first area of parallel marks on a paper sheet using the absorbent ink cartridge of the second print head, each mark being separated by a first predetermined pitch and having a width not exceeding a width of the laser spot;

making, by the laser beam, lines of spots in the marked first area, the lines of spots being parallel to the previous marks and being separated by a determined pitch different from the first pitch;

observing the marks and sending information to the printer or a computer controlling the printer to identify which marks have been cut.

Claim 53 (New): A procedure for adjusting a cutting speed of the device according to claim 30, comprising:

making marks on a sheet using the ink cartridge of the second print head;

passing the laser spot over the marks at different speeds;

observing conditions under which a complete cut can be obtained.

Claim 54 (New): A computer system comprising:

a computer and software; and

a peripheral device according to claim 30,

the computer and the software being used to define patterns to be cut out coherent with the patterns to be printed that are to be made on a paper sheet, and providing instructions to the peripheral device so that the peripheral device can make the printouts and cuts.

Claim 55 (New): A system according to claim 54, wherein the computer and the software supply instructions to the peripheral device so that the peripheral device can make interruptions in the paper cut following the target cutting pattern.

Claim 56 (New): A system according to claim 55, determining cut paper areas to be eliminated, using an appropriate marking done with the first print head, leaving an operator free to manually detach the cut paper areas later.

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Claim 57 (New): A method for creating documents or paper objects, using the computer system according to claim 54.

Claim 58 (New): A method for making a glued structure, comprising:
making a document from a sheet of paper using the computer system according to claim 54, the document comprising at least one part on which glue is to be applied marked by a gluing pattern;

feeding a multi-layer comprising, in order, a silicone coated support, an adhesive film, and a printable surface film, into the peripheral device, the adhesive film bonding to the film better than to the support, and bonding to the document made in the making a document being better than to the film, the film and the adhesive film being absorbent at an operating wavelength of the laser;

making a gluing pattern corresponding to the gluing pattern made on the document on the multi-layer by printing the surface film using the first print head of the peripheral device;

making a cut on the multi-layer using the laser, to delimit an area surrounding the gluing pattern in the surface film and the adhesive film, with dimensions corresponding to a part of the document on which glue is to be applied;

separating the area from the silicone coated support;

positioning the adhesive film side of the area on the document making the gluing patterns of the document and the surface film correspond;

removing the surface film from the area; and

sticking a part of the document on which the adhesive film is located, or another document.